first was the westward passage, from Reykjavik, Iceland, to Cartwright, Labrador, of 24 Italian seaplanes manned by more than 100 officers and men commanded by General Italo Balbo. Chart IX, for July 12, depicts the weather conditions attending this largest undertaking in the annals of ocean aviation.

A few days later, Mr. Wiley Post, American pilot, set out from New York on the trans-Atlantic leg of his solo flight around the world. He landed safely in Berlin within 26 hours after take-off, thus setting a speed and distance record for the crossing. Chart X reproduces the synoptic map of July 15, in connection with Post's flight.

OCEAN GALES AND STORMS, JULY 1933

Vessel	Voyage		Position at time of lowest barometer		Gale began	Time of lowest barometer	Gale ended	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN			° ′	° ′				*Inches*					
Dakotian, Br.S.S.	Liverpool	Boston	47 49 N	50 25 W	July 1	Mdt. July 1.	July 2	29.27	SW	SW, 9	N	SW, 9	SW-W.
Santa Elisa, Am. S.S.	Cristobal	Habana	23 00 N	84 03 W	July 2	4a, 3	July 3	29.45	NNE		SSE	SE, 9	E-SE.
Carrillo, Am. S.S.	New Orleans	do	24 20 N	84 42 W	July 3	Noon, 3	do	29.59	E	ESE, 9	S	ESE, 9	E-ESE.
Fernbrook, Nor. M.S.	Colon	Baltimore	36 03 N	75 23 W	do	8a. 3	do	29.86	NE	SW, 4	NE	NE, 8	SW-W-NE.
John D. Archbold, Am. S.S.	Corpus Christi.	New York	24 24 N	88 00 W	July 4	Noon, 4.	July 4	29.28	NE		SSE	W, 10	W-SW.
Sylvan Arrow, Am.S.S.	Beaumont	do	25 25 N	88 20 W	do	3p, 4	July 5	29.13	NNE	WNW, 11	SE	W, 11	NNW-SW.
Europa, Ger.S.S.	New York	Cherbourg	39 42 N	67 55 W	do	2p, 4	July 4	29.57	NNE	NE, 11	SSE	NNE, 11	NE-SE.
Gripsholm, Swed.M.S.	do	Gothenburg	40 40 N	67 55 W	do	4p, 4	do	29.70	NE	NE, 10	E	NE, 10	
Geo. H. Jones, Am.S.S.	New Orleans	New York	25 20 N	90 30 W	do	1a, 5	July 5	28.66	NNW	SE, 11	SE	NW-SE, 11.	WNW-SE.
Lena Luckenbach, Am. S.S.	do	Panama	25 32 N	90 40 W	do	3a, 5	do	28.51	NE		SE	NW, 12	N-W-S.
E. M. Clark, Am.S.S.	New York	CorpusChristi	24 36 N	94 51 W	July 3	3a, 6	July 6	29.41	NNE	SSW, 10	E	SW, 10	SW-SSW-S.
Nashaba, Am.S.S.	Antwerp	Tampa	44 30 N	17 30 W	July 5	10a, 6	do	29.50	S	W, 10	W	W, 10	Steady.
Adria, Ger.S.S.	Las Piedras	Dundee	45 18 N	42 36 W	July 7	4a, 8	July 9	29.97	SSW	SW, 7	WNW	SW, 8	SSW-SW-WNW.
Lena Luckenbach, Am. S.S.	New Orleans	Panama	13 $\overline{32}$ N	80 32 W	July 9	2a, 9	do	29.83	E	E, 7	E	E, 8	Steady.
Black Falcon, Am.S.S.	Antwerp	New York	46 15 N	40 50 W	July 11	9p, 11	July 12	30.00	WSW	WSW, 7	W	W, 8	WSW-W.
Jean Jadot, Belg.S.S.	New York	Antwerp	48 10 N	29 08 W	do	8p, 12	July 13	29.94	WSW	WNW, 9	NW	NW, 9	W-WNW-NW.
Katendrecht, Du.M.S.	Rouen	Philadelphia	49 20 N	22 16 W	July 12	8p, 12	do	29.71	W	W, 7	WNW	W, 8	Steady.
Statendam, Du.S.S.	Rotterdam	New York	49 59 N	20 14 W	July 14	2p, 14	July 14	29.79	W	W, 8	NW	—, 8	W-WNW-NW.
Dresden, Ger.S.S.	Galway	do	51 12 N	25 54 W	July 18	5a, 18	July 18	29.46	SSE	W, 8	WNW	W, 8	SSW-W.
Daytonian, Br.S.S.	Guadeloupe	Havre	17 37 N	60 47 W	July 25	11a, 25	July 25	29.87	NE	NE, —	E	E, 9	NE-ENE-E.
Barneveld, Du.S.S.	Caracas	Liverpool	32 36 N	53 04 W	July 24	8a, 25	do	29.76	N	SSE, 9	SE	SSE, 9	None.
Gonzenheim, Ger.S.S.	Antwerp	Botwood	51 56 N	19 26 W	July 25	2p, 25	do	29.38	SW	NW, 8	NW	NW, 9	SE-NW.
Gateway City, Am.S.S.	London	Panama City, Fla.	34 02 N	51 05 W	do	3a, 26	July 26	29.84	SSE	SSW, 8	WSW	SSW, 8	SSE-SSW-SW.
Emilia, Am.S.S.	New York	San Juan	[1]21 00 N	65 30 W	July 26	Mdt., 26	do	29.97	ENE	SE, 6	SE	E, 8	Steady.
Noreg, Nor.S.S.	Bordeaux	Aruba	25 02 N	75 18 W	July 28	10a., 28	July 29	29.58	E	SE, —	SE	SE, 11	
Gulflight, Am.S.S.	New York	Port Arthur	28 20 N	77 30 W	July 29	11p., 29	July 30	30.02	E	ESE, 7	SE	E, 8	E-SE.
New York, Ger.S.S.	Cherbourg	New York	49 54 N	8 12 W	do	4a., 29	do	29.84	S	S, 4	NW	W, 8	SW-W.
Saccarappa, Am.S.S.	Antwerp	Charleston	50 15 N	37 00 W	do	11a., 29	July 29	29.73	NE	N, 7	N	N, 8	NE-N.
President Harding, Am. S.S.	Cobh	New York	50 42 N	22 00 W	July 30	5a., 30	July 30	29.53	S	SW, 9	NW	WNW, 10	S-WSW.
Peten, Am.S.S.	New York	Habana	26 46 N	79 21 W	July 29	2a., 30	do	29.64	E	Var., 2	WSW	SW, 10	NE-SW.
El Almirante, Am.S.S.	Galveston	Boston	27 03 N	79 35 W	July 30	4a., 30	do	29.46	W	SE, 12	SE	SE, 12	W-SE.
Jean Jadot, Belg.S.S.	Antwerp	New York	49 35 N	18 53 W	do	6a., 30	do	29.80	SSW	SSW, 6	NNW	WNW, 9	W-NW.
NORTH PACIFIC OCEAN													
Brandywine, Am.S.S.	Los Angeles	Portland, Oreg.	40 12 N	124 44 W	July 5	11p., 5	July 7	29.86	NW	NW, 7	NW	NW, 8	NW-N.
Toba Maru, Jap.S.S.	Balboa	Los Angeles	15 40 N	97 55 W	July 7	2p., 7	July 8	[2]29.70	ESE	E, 7	SSW	S, 7	Var.
City of Elwood, Am.S.S.	do	do	16 25 N	100 36 W	July 8	4a., 8	do	29.68	SSW	Var., 8	SSW	SSW, 9	Var.
Memphis City, Am.S.S.	Los Angeles	Balboa	[1]17 30 N	102 00 W	do	5p., 8	do	29.56	NNE	NNE, —	SW	NNE, 8	NNE-SW.
Hofuku Maru, Jap.S.S.	do	do	17 13 N	101 15 W	do	7a., 8	do	[2]29.60	SSW	SSW, 8	SE	SSW, 9	SSW-SSE.
Neches, U.S.S.	San Diego	do	7 55 N	83 57 W	July 22	4a., 22	July 22	29.80	SSW	W, 4	SSW	SE, 12	SE-S.
Drechtdyk, Du.S.S.	Los Angeles	do	16 12 N	99 44 W	July 29	1p., 29	July 29	29.80	NE	ESE, 7	SSE	E, 8	E-SE.
Holystone, Br.S.S.	Panama	Vancouver	16 33 N	100 52 W	do	4p., 29	do	29.62	NNE	ESE, 9	WSW	WSW, 12	ESE-WSW.
Golden Star, Am.S.S.	Philippines	San Francisco	18 17 N	135 05 E	July 28	do	July 30	29.52	E	ESE, —	S	E, 10	E-ESE-SE.
Michigan, Am.S.S.	do	do	20 30 N	132 12 E	July 30	Mdt., 30	July 31	[2]28.92	ENE	ESE, 12	SSW	E, 12	Do.

[1] Position approximate.

[2] Barometer uncorrected.

NORTH PACIFIC OCEAN, JULY 1933

By WILLIS E. HURD

Atmospheric pressure.—A great and practically unbroken high-pressure area covered the major part of the North Pacific Ocean during July 1933. Pressures were above normal from the Bering Sea southward to Honolulu and Midway Island, and along the northern coast of the United States, and were below normal from California southward, and in the extreme southwestern part of the ocean. Some unimportant depressions appeared in northern latitudes of the Pacific, but the Aleutian LOW was largely indicated as having receded to the Arctic Ocean (Point Barrow, 29.76 inches).

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, July 1933, at selected stations*

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Point Barrow	29.76	−0.16	30.16	14	29.34	4
Dutch Harbor	29.98	+.04	30.44	1	29.52	27, 29
St. Paul	29.96	+.12	30.34	14	29.34	28
Kodiak	29.92	−.02	30.18	14	29.60	9
Juneau	30.01	−.04	30.37	14	29.55	1
Tatoosh Island	30.12	+.07	30.36	4	29.73	1
San Francisco	29.89	−.06	30.11	3	29.73	27
Mazatlan	29.84	−.09	29.94	14	29.66	8
Honolulu	30.07	+.05	30.16	1	29.97	22
Midway Island	30.19	+.08	30.28	1	30.06	31
Guam	29.79	−.05	29.86	16	29.70	3
Manila	29.75	−.05	29.86	1	29.58	28
Naha	29.76	+.04	29.92	6	29.22	31
Chichishima	29.89	+.04	30.08	25	29.74	9
Nemuro	29.88		30.12	30	29.46	23

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

Cyclones and gales.—No cyclones crossed the North Pacific high pressure region this month, and no gales were reported except from the American coastal region and the Far East. A fresh northwest gale was experienced at sea south of Eureka on the 5th; otherwise, all gales were of tropical character.

Closely following the disintegration of a West Indian hurricane that crossed the east Mexican coast on the 6th, moderate southerly gales occurred in the Pacific midway between Salina Cruz and Acapulco on the 7th, and fresh to strong southwesterly to rapidly shifting gales of cyclonic nature, with barometer depressed about 0.20 inch, were reported near Acapulco on the 8th.

On the 29th, in the same locality (16°35′ N., 100°52′ W.), the British steamship *Holystone* reported a disturbance of cyclonic characteristics, accompanied by much thunder and lightning, with a maximum velocity of force 12 from west-southwest in a gust at 4:20 p.m.

A violent gale (SE., force 12) of brief duration, accompanied by a pressure drop of 0.06 inch, was reported by the U.S.S. *Naches* on the 22d off the extreme southern coast of Costa Rica (7°55′ N., 83°57′ W.). The ship reported "passing through the inner circle of a tropical disturbance." Heavy rain and thunder squalls were noted by other ships in this neighborhood on the 20th to 22d.

Typhoon of the Far East.—There were some evidences of cyclonic activity on several occasions in the Far Eastern tropics during July, but so far as at present indicated only one of these disturbances developed any marked intensity. This was a typhoon which originated near Guam on the 24th. On the 31st, with greatly increased intensity, it was over the Nansei Islands, approaching Japan. The American steamship *Golden Star* encountered this typhoon on the 28th to 30th, with maximum wind velocity of force 10 from the east on the 29th, and lowest barometer 29.52, at 18°17′ N., 135°05′ E. The American steamship *Michigan* encountered full hurricane velocities from east and southeast on the night of the 30th–31st, near 20°30′ N., 132°12′ E., with uncorrected barometer down to 28.92 inches. The typhoon at that time was reported as developing and moving northeast with a speed of 30 kilometers per hour.

Fog.—Fog was most frequent off the coast of Lower California, where it was reported on 11 days. But about 10 days with fog were noted along the entire northward coast to the mouth of the Columbia River. Along the northern steamship routes some 20 to 30 percent, or more, of days had fog from 150° W. to 150° E.

TYPHOONS OF JUNE AND JULY 1933 IN EASTERN SEAS

By Rev. C. E. DEPPERMANN, S.J.

[Assistant Director, Philippine Weather Bureau, Manila]

The following remarks regarding depressions of typhoon character that came in rapid succession beginning June 27, 1933, involve the use of ideas from the Norwegian system of frontal analysis. I find in them the key to the solution of Far Eastern weather problems; the only trouble is that very often, due to lack of observations from ships on the Pacific and from Central Asia, the key cannot be used with precision.

There were no typhoons until near the end of June, when a weak disturbance began the season. Thereafter followed four others. These are noted individually as follows, the dates being those on which the depressions could be first definitely identified:

(1) *June 27.*—This originated east of Hainan in the "intertropical front", i.e., the front between the trade wind and the so-called "southwest monsoon" (southern hemisphere air). The trade wind to the north was going from east to west, blocking the path of the southwest monsoon. The mountain ranges along the eastern coast of Indo-China helped to perpetuate the cyclonic motion once it started. This typhoon traveled slowly north and when it reached the interior of southern China on June 30 dissipated; at the same time a depression started west of Amoy, giving the false impression that the typhoon had quickly gone north to Shanghai and Korea.

(2) *July 16.*—This typhoon was first discovered near 17° N., 134° E., but it is probable that it started much farther east on the intertropical front, between Guam and the Bonins. It traveled westward along the front until the end of the 17th, when it turned northward around the trade-wind HIGH until it came to the Eastern Sea, during the 20th, about which time the storm had much occluded. There it broke connections with the intertropical and joined the polar front, continuing along the latter toward the Aleutian Islands until off our maps, on the 24th.

(3) *July 19.*—This typhoon was first observed when it came into the region of our maps around Guam, also on the intertropical front. Its later course was almost identical with the preceding typhoon, passing into the Eastern Sea on the 24th and thence northeastward beyond the range of the maps, on the 26th. Neither of these typhoons (2 and 3) was of more than moderate intensity.

(4) *July 27.*—Due to lack of observations this can at present be traced no farther eastward toward its origin than the 127th meridian at latitude 17° N. It undoubtedly started beyond that point on the intertropical front, which it followed until disappearance over northern Indo-China on the 31st. This front, after the preceding typhoon (3), settled down to the line between Formosa and North Luzon, over Hainan, from the direction of the Carolines. This depression was small when it reached the Philippines, but increased a bit in intensity as it got into the China Sea.

(5) *July 26 (Guam).*—This began about 400 miles east of Yap and about due south of Guam, on the same front, and followed the same track as typhoon (4) until near the Philippines. Here an interesting change of direction occurred. Although the intertropical front still went west to Hainan where the preceding depression was located, this typhoon went north after the 30th. Why? Most probably the *main* stream of the trade wind (in the upper air) went north and not west at the place of departure from the surface front. Typhoons seem to follow the direction of the air stream of the medium upper levels.

This typhoon slackened its pace and deepened very much as it reached the Loo-Choos on August 1. In the Eastern Sea it broke again with the southwest monsoon and entered the polar front circulation. There was much damage in Korea, over which the storm passed on August 4. Thereafter, in the Japan Sea, something peculiar seems to have happened, and it is possible that the typhoon split, one part going on northeastward, and the other re-forming to the east of central Japan and then going east. We must await further information on this situation.